

Applicants : Zhongyi Li, et al.
Serial No. : 10/577,564
Filed : April 27, 2006
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Amendments to the Claims

Please amend the claims by replacing all prior listings of claims with the listing of claims below pursuant to 37 C.F.R. §1.121:

Listing of claims:

1. (Currently Amended) Grain obtained from a rice plant, comprising (i) starch, (ii) an exogenous nucleic acid molecule comprising a sequence which is the same as, or fully complementary to, a nucleotide sequence of at least 50 contiguous nucleotides of the starch branching enzyme IIa (SBEIIa) gene coding region whose sequence is set forth in SEQ ID NO:2 which inhibits the expression of a rice SBEIIa gene, (iii) a reduced level of SBEIIa protein and, (iv) a reduced level of starch branching enzyme IIb (SBEIIb) protein in the rice grain, the reduced level of SBEIIa protein and of SBEIIb protein being relative to rice grain of an Indica variety,

wherein the proportion of amylose in the starch of the grain is at least 40% as measured by an iodometric method.

2. (Currently Amended) The grain of claim 1, further comprising ~~two or more genetic variations, wherein one genetic variation is selected from the group consisting of~~
 - ~~a) a mutation of an SBEIIa gene which inhibits SBEIIa expression and/or activity, and~~
 - ~~b) an introduced nucleic acid which inhibits SBEIIa expression and/or activity, and~~and wherein a second a genetic variation [[is]] selected from the group consisting of

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- e) a) a mutation of an *SBEIIb* gene which inhibits *SBEIIb* expression and/or activity, and
- d) b) an introduced nucleic acid which inhibits *SBEIIb* expression and/or activity.

3. (Canceled)

4. (Previously Presented) The grain of claim 1, wherein the proportion of amylose in the starch of the grain is at least 50%.

5. (Canceled)

6. (Currently Amended) The grain of claim 1, [[5,]] wherein the ~~transgene encodes~~ exogenous nucleic acid molecule is an antisense, ~~co-suppression~~, ribozyme or duplex RNA molecule.

7. (Canceled)

8. (Previously Presented) The grain of claim 2, further comprising a reduced level of SBEI protein and/or activity.

9. (Previously Presented) The grain of claim 1, comprising an altered level of a protein and/or enzyme activity selected from the group consisting of ADP glucose pyrophosphorylase, GBSS, SSI, SSII, SSIII, a debranching enzyme of an isoamylase type and a debranching enzyme of a pullulanase type.

10. (Original) The grain of claim 9, comprising an altered

level of GBSS protein and/or enzyme activity.

11. (Previously Presented) The grain of claim 1 which is non-shrunken.
12. (Currently Amended) The grain of claim 1 which is brown rice grain having an average weight of at least about 25 mg.
13. (Previously Presented) The grain of claim 1 wherein at least 50% of starch granules within the grain appear non-birefringent when observed under polarized light.
14. (Previously Presented) The grain of claim 1 which has a starch content that is at least 90% of the starch content of equivalent, but unaltered, grain.
15. (Withdrawn) The grain of claim 2, further comprising a null mutation of the *SBEIIa* or *SBEIIb* gene.
16. (Withdrawn - Currently Amended) The grain of claim 1 ~~which is of an Indica variety or~~ which comprises a *Wx^a* allele.
17. (Withdrawn - Currently Amended) A rice plant ~~capable of producing the grain according to claim 1.~~ comprising i) an exogenous nucleic acid molecule comprising a sequence which is the same as, or fully complementary to, a nucleotide sequence of at least 50 contiguous nucleotides of the starch branching enzyme IIa (SBEIIa) gene coding region whose sequence is set forth in SEQ ID NO:2 which inhibits the expression of a rice SBEIIa gene, (ii) a

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reduced level of SBEIIa protein, (iii) a reduced level of starch branching enzyme IIb (SBEIIb) protein in the rice plant, the reduced level of SBEIIa protein and of SBEIIb protein being relative to rice plant of an Indica variety, and (iv) rice grain

wherein the rice grain comprises starch, and

wherein the proportion of amylose in the starch of the rice grain is at least 40% as measured by an iodometric method.

18. (Withdrawn - Currently Amended) Rice starch granules, comprising (i) starch, (ii) an exogenous nucleic acid molecule comprising a sequence which is the same as, or fully complementary to, a nucleotide sequence of at least 50 contiguous nucleotides of the starch branching enzyme IIa (SBEIIa) gene coding region whose sequence is set forth in SEQ ID NO:2 which inhibits the expression of a rice SBEIIa gene, (iii) a reduced level of SBEIIa protein and, (iv) a reduced level of starch branching enzyme IIb (SBEIIb) protein in the rice starch granules, the reduced level of SBEIIa protein and of SBEIIb protein being relative to rice starch granules of an Indica variety,

wherein the proportion of amylose in the starch of the grain granules is at least 40% as measured by an iodometric method.

19. (Canceled)

20. (Withdrawn - Currently Amended) A product comprising rice starch granules, comprising (i) starch, (ii) an exogenous nucleic acid molecule comprising a sequence which is the same as, or fully complementary to, a nucleotide sequence of at least 50 contiguous nucleotides of the starch branching enzyme IIa (SBEIIa) gene coding region whose

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sequence is set forth in SEQ ID NO:2 which inhibits the expression of a rice SBEIIa gene, (iii) a reduced level of SBEIIa protein and, (iv) a reduced level of starch branching enzyme IIb (SBEIIb) protein in the rice starch granules, the reduced level of SBEIIa protein and of SBEIIb protein being relative to rice starch granules of an Indica variety,

wherein the proportion of amylose in the starch ~~of the grain granules~~ is at least 40% as measured by an iodometric method.

21-23. (Canceled)

24. (Withdrawn - Currently Amended) A method of producing a rice plant capable of producing grain, the grain having starch comprising at least 40% amylose, comprising the steps of

- a) ~~introducing a genetic variation into a parent rice plant or seed~~ an exogenous nucleic acid molecule comprising a sequence which is the same as, or fully complementary to, a nucleotide sequence of at least 50 contiguous nucleotides of the starch branching enzyme IIa (SBEIIa) gene coding region whose sequence is set forth in SEQ ID NO:2 which inhibits the expression of a rice SBEIIa gene; and
- b) identifying a progeny plant of the parent rice plant or seed, wherein the starch of grain of the progeny plant comprises at least 40% amylose as measured by an iodometric method.

25-42. (Canceled)

43. (Currently Amended) An isolated nucleic acid molecule

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comprising a sequence which is the same as, or fully complementary to, a nucleotide sequence of at least 50 contiguous nucleotides set forth in SEQ ID NO:2 which,
which encodes an inhibitor of rice SBEIIa and an inhibitor of rice SBEIIb, which may be the same or different.

44-47. (Canceled)

48. (New) The rice grain of claim 1 which is milled, ground, kibbled, cracked, rolled, boiled, or whole grain.

49. (New) A composition comprising the rice grain of claim 1 and a food ingredient or water.

50. (New) The composition of claim 51, which is bread, cake, cracker or biscuit.

51. (New) The composition of claim 51, which is a breakfast cereal.

52. (New) The composition of claim 51, noodles, rice cakes, rice paper or egg roll wrapper.

53. (New) A process for making a food product comprising,
a) processing the rice grain of claim 1 so as to make flour, brookers, rice bran or oil, and
b) including the flour, brookers, rice bran or oil in the food product.

54. (New) A process for making a food product comprising,
a) milling the rice grain of claim 1,

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b) separating starch from the milled material of
step a), and

c) processing the starch separated in step b) to
make the food product.

55. (New) The rice grain of claim 1 which is of an Indica
variety.